Science instrument Concept Evaluation Technical Panel Instructions

Context:
Science instruments (SIs) for the NGST will be procured from the US, European, and Canadian scientific and technical communities via NASA, ESA, and CSA solicitations, and integrated into a science instrument module (the Integrated Science Instrument Module, or ISIM). A strict cost cap will make achievement of the required and desired scientific performance of the NGST quite challenging.

To facilitate specification of generic SI functionality (e.g., near-IR imagery, near-IR spectroscopy, mid-IR spectroscopy, etc.) and allocation of responsibilities among NASA, ESA and CSA, these agencies commissioned a dozen SI concept studies and received several unsolicited studies in order to yield notional examples of specific NGST instrument options[1]. These studies will be evaluated by the NGST Project Scientist, who will recommend a generic functional specification for the suite of NGST instruments and report findings to NASA, ESA, and CSA in support of inter-agency negotiations during early '00 for the allocation of responsibilities. The Project Scientist has convened two advisory panels to assist in this evaluation: a science panel and a technical panel[2]

Technical Panel Charter:
The technical panel will evaluate SI concepts for technical and cost feasibility relative to the NGST schedule and budget[3], without regard for how instrumentation may be apportioned among NASA, ESA, and CSA. This panel consists of engineers, management, and instrument specialists[4] and is chaired by the ISIM Manager Paul Geithner. The panel chair will brief major findings to the Science Panel during Nov '99 and will deliver, to the NGST Project Scientist, a report by 1 Dec '99 addressing the following questions:

1) Are the SI concepts technically feasible relative to the NGST Reference Architecture (i.e., "Yardstick" architecture) and schedule milestones for technology freeze, SI CDR, and SI delivery?
2) Are the SI concept ROM cost estimates credible?
3) Are there important differences among the SI concepts in terms of potential technical risk, operations complexity, and system level impact on NGST?
4) Are there important SI technology challenge areas among these SI concepts for which technology development would be needed to enable a credible flight instrument proposal during early 2002?

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[1] These 15 studies are not meant to define the NGST instruments, nor are they intended to pre-select or favor certain scientists, science teams or companies. The are for the purpose of scientific and technical feasibility assessment to facilitate future decisions about NGST requirements and specifications. These reports may be downloaded from http://wwwmipd.gsfc.nasa.gov/isim/science.htm
[2] For more information about the panels, see "Science Instrument Concept Evaluation Panel Charters" by M. Greenhouse at http://www701.gsfc.nasa.gov/isim/docs/jsrb_charter3.pdf
[3] For NGST schedule and budget information, see http://www.ngst.nasa.gov/project/
[4] For the list of technical panel members, download http://ngst.gsfc.nasa.gov/cgi-bin/pubdownload?Id=510

Technical Panel Tasks:

- *Before 1st Technical Panel Meeting (i.e., before 13 Oct):*
  - Read the SI concept reports at http://wwwmipd.gsfc.nasa.gov/isim/science.htm (US reports available after 1 Sep; ESA and CSA reports available after 5 Oct)
  - Concentrating on your assigned focus area as identified in the panel member matrix at http://ngst.gsfc.nasa.gov/cgi-bin/pubdownload?Id=510, identify the critical technologies and risks inherent in each of the instrument concepts:
    - for critical technologies, assess their maturity by assigning a Technology Readiness Level (TRL) to each one (see http://ngst.gsfc.nasa.gov/cgi-bin/pubdownload?Id=375 for definitions of TRLs)
    - estimate how much money and effort (in terms of manpower and facilities/capital equipment) and briefly describe the development tasks you judge necessary to bring each technology to TRL 6 by 2003
    - assess the chance (high=70-100%; medium=30-70%; low=0-30%) of each technology maturing to TRL 6 by 2003, even if the necessary development resources you identified to bring the technology to TRL 6 were applied
    - qualify and assess risks (e.g., failure of a device, delay in production or assembly or integration, etc.) by assigning 1) a likelihood of occurrence (high=70-100%; medium=30-70%; low=0-30%), and 2) a severity of consequences (catastrophic, serious, moderate, minimal)[5] should the risk occur and become a problem
    - assess the implications on system design, cost, performance, and operability of the various instrument concepts (the "Yardstick" architecture and ISIM may be used as a reference for comparison)
  - Record any questions you may have about the concept studies for the authors or the NGST Ad Hoc Science Working Group (ASWG)

  * *members should make a best effort at the above tasks before the 1st panel meeting*

- *1st Technical Panel Meeting, 14-15 Oct:*
  - Review and complete the tasks listed above
  - For members with a focus on technology: estimate the likely development (i.e., procurement, fabricate, build, assembly, integrate and test, or Phase C/D) cost of each critical technology component or subsystem
  - For members with a focus in cost or systems: estimate the likely development (i.e., procurement, fabricate, build, assembly, integrate and test, or Phase C/D) cost of the instruments described in the studies
  - Receive and review a list of specific questions from the ASWG, and assign actions to answer these before the "ASWG+ meeting" at the STScI on 3-5 Nov (the panel chair will brief the "ASWG+" on the panel's progress and interim findings at the "ASWG+" meeting)
  - Formulate preliminary answers to the four questions within the technical panel charter

[5] **Catastrophic** = loss of mission or all core science capability; **Serious** = loss of some core science capability and/or increased risk to entire mission; **Moderate** = degradation of core science capability, loss of non-core science capability, reduction in observatory operability or efficiency, or increased risk to science mission; **Minimal** = loss of redundancy, increased risk to portion of science program or operability

- *Before "ASWG+" meeting (i.e., before 2 Nov):*
  - Answer specific questions asked by the ASWG before the "ASWG+ meeting" at the STScI on 3-5 Nov

- *Before 2nd Technical Panel Meeting (i.e., before 8 Nov):*
  - For members with a focus on technology: estimate the likely development (i.e., procurement, fabricate, build, assembly, integrate and test, or Phase C/D) cost of each critical technology component or subsystem
  - For members with a focus in cost or systems: estimate the likely development (i.e., procurement, fabricate, build, assembly, integrate and test, or Phase C/D) cost of the instruments described in the studies

- *2nd Technical Panel Meeting, 9-10 Nov:*
  - Debrief results and output from the "ASWG+" meeting of 3-5 Nov and solicit feedback from the technical panel
  - Review panel member's finding and observations
  - Arrive at draft technical panel conclusions and answers to the four charter questions
  - Identify and assign any action items to tie-up loose ends prior to issuing panel findings to the ASWG in late Nov and the NGST Project Scientist before 1 Dec

- *Before 22 Nov and "ASWG-" meeting:*
  - Finalize all technical panel actions
  - Prepare draft technical panel report, circulate among technical panel members, and brief to ASWG at ASWG meeting (tentatively 23-24 Nov)

- *Report to Project Scientist, 1 Dec:*
  - Technical Panel chair presents panel's report to NGST Project Scientist